HALEY & ALDRICH, INC.

SITE-SPECIFIC HEALTH & SAFETY PLAN

for

Boeing Realty Corporation Former C-6 Facility

19503 South Normandie Avenue

Project/File No. 27285-005

Prepared by: Mark Golembiewski/Anita Broughton Date: 8 June 2001

Revised by: Date:

APPROVALS: The following signatures constitute approval of this Health & Safety Plan. Deviations from this Plan are not permitted without prior approval from the undersigned.

Anita Broughton, CIH - Office H&S Coordinator 6/18/01 Date

Scott Zachary - Project Manager 6/18/01 Date

Mark Golembiewski, CIH - Corporate H&S Manager _____ Date _____

PRE-WORK HEALTH & SAFETY BRIEFING

I have attended a briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE

1.0 PROJECT INFORMATION

Name of Project: BRC Former C-6 Facility Investigation/Remediation	**H&A File No.:** 27285-005
Location: 19503 South Normandie Avenue Los Angeles, CA	
Client/Site Contact: Brian Mossman Stephanie Sibbett	**Contact Phone No.:** (818) 586-6015 (562) 593-8623
H&A Project Manager: Scott Zachary	**PM Phone No.:** (619) 818-1790

SCOPE OF WORK:

Activities performed at the site will include utility clearance, drilling operations for the advancement of soil borings and collection of soil samples via direct-push and hollow stem auger methods, stockpile sampling, soil vapor sampling, groundwater monitoring well installation, groundwater sampling, trenching, light construction oversight, installation and operation of soil vapor extraction (SVE) and groundwater remediation systems, and demolition activities.

Subcontractor(s) to be involved in on-site activities:

Name	Work Activity
West Hazmat Drilling	Soil boring / monitoring well installations
Water Development Corporation	Soil boring / monitoring well installation
Geovision	Utility Clearance
Value Engineering, Inc.	General Contractor (piping, electrical, etc.)
Baley Construction	Trenching
Tait Environmental	Groundwater Monitoring

Projected Start Date: June 1, 2001

Projected Completion Date: Unknown

Estimated Number of Days to Complete Field Work: Unknown

A copy of this Site Health and Safety Plan, along with any addenda containing activity specific health and safety information, will be kept in a conspicuous location on site by Haley & Aldrich personnel at all times while work is being conducted.

NOTE: This Site Health and Safety Plan provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this site plan, including safe work, training, medical monitoring, and recordkeeping practices, are described in the Haley & Aldrich Corporate Health and Safety Program Manual and are hereby made part of

this plan by reference. The corporate program complies with 8 CCR 5192, Hazardous Waste Operations and Emergency Response. The program manual is available to all employees and to outside parties by request.

2.0 SITE DESCRIPTION

Check one of the following:

Site classification:	X	Industrial		Commercial		Other:

2.1 General Description: (include site history/usage; type of facility; type of investigation; materials stored/used on site; whether paved or landscaped, etc.)

The BRC Former C-6 property (formerly Douglas Aircraft) is bounded by a railroad right-of-way and Normandie Avenue to the east, 190th Street to the north, International Light Metals to the west, and Montrose Chemical to the south. The surrounding area consists primarily of industrial and commercial properties with some residential developments. The McDonnell Douglas Corporation operated an aerospace parts manufacturing facility on this site since the 1940s. All of the above ground facility structures have been demolished

Site Status (mark all that apply):

	Active		Inactive
X	Partially Active		Other:

Site history information sources used; check all that apply:

	City Directories		Sanborn Maps
	Geological References		State Files
	Previous report by H&A		Water Quality Maps
X	Previous report by others	X	Inquiries

Is a **site plan** or sketch available? Y X N___ If yes, attach a copy to this plan.

Indicate any **unusual features** at the site (power lines, variable terrain, etc.):

Heavy equipment is often on site due to grading and redevelopment activities not associated with this site investigation.

2.2 Work Areas

List/identify each specific work area(s) on the job site and indicate its location(s) on the site plan:

1. Multiple drilling, trenching, and environmental investigation and construction locations within a vacant lot of approximately 50 acres

3.0 PROJECT TASK BREAKDOWN

List and describe each distinct work task below:

Task No.	Task Description	Employee(s) (approximate)	Work Date(s) or Duration
1	Utility Clearance	1 Geovision 1 H & A	Ongoing
2	Soil boring installation and sampling	2 West Hazmat 1 H & A	Ongoing
3	Stockpile soil sampling	1 H & A	Ongoing
4	Groundwater monitoring well installation	2 West Hazmat 1 H & A	Ongoing
5	Groundwater sampling	2 Tait Environmental	Ongoing
6	Trenching	2 Baley Construction 1 H & A	Ongoing
7	Light construction oversight	1 H & A 1 Boeing	Ongoing
8	Installation of SVE and groundwater remediation systems	1 H & A 2-6 other subcontractors	Ongoing
9	Operation of SVE and groundwater remediation systems	1 H & A	Ongoing
10	Demolition activities	1 H & A 2 Baley 1 Boeing	Ongoing

4.0 HAZARD ASSESSMENT

4.1 Chemical Hazards

Is **chemical analysis data** available? Y X N _ **Table 1** (attached) summarizes the maximum concentrations of chemicals detected in groundwater. **Table 2** (attached) summarizes the maximum concentrations of chemicals detected in soil samples.

Does chemical analysis data indicate that the site is contaminated? Y X N __

Potential **physical state** of the hazardous materials at the site (mark all that apply):

X	Gas/Vapor		Sludge
X	Liquid	X	Solid/Particulate

Anticipated/actual **class of compounds** (mark all that apply):

	Asbestos		Inorganics
X	BTEX		Pesticides
X	Chlorinated Solvents	X	Petroleum products
X	Heavy Metals	X	Other: PCBs

Impacted environments (indicate all media in which contamination is expected):

	Air	X	Groundwater
X	Soil		Sediment
	Surface water		Other:

Estimated concentrations/medium of major chemicals expected to be encountered by onsite personnel during work activities:

Work Activity	Media	Chemical	**Maximum** Anticipated Concentration
Soil boring/sampling monitoring activities	SO	Petroleum hydrocarbons Diesel fuel	20,000 mg/Kg 20,000 mg/Kg
Soil boring/sampling monitoring activities	SO	PCBs	9.8 mg/Kg
Soil boring/sampling monitoring activities	SO	1,1-dichloroethene Trichloroethylene 1,1,1-TCA	390 mg/Kg 490 mg/Kg 300 mg/Kg

Soil boring/sampling monitoring activities	SO	Arsenic Hexavalent Chromium Lead	350 mg/Kg 491 mg/Kg 1790 mg/Kg
Well installation/ groundwater sampling activities	GW	Trichloroethylene 1,1,1-trichloroethane toluene methyl isobutyl ketone 1,1-dichloroethene	29 ppm 110 ppm 140 ppm 100 ppm 88 ppm

(Media key: A = Air; GW = Groundwater; SW = Surface Water; SO = Soil; SE = Sediment)

Table 3 and **Table 4** (attached) provide a summary of the exposure symptoms and the allowable exposure limits, respectively, for the primary chemicals of concern.

Other site (safety) concerns related to the chemicals present on this site: None

4.2 Physical Hazards

Is any site work area(s) to be entered for this project considered a confined space? Y__ N **X**

If yes, indicate which area(s) and why:

ALL CONFINED SPACE ENTRIES REQUIRE SPECIAL PROCEDURES, PERMITS AND TRAINING AND MUST BE APPROVED BY THE CORPORATE HEALTH & SAFETY MANAGER

Physical Hazard Checklist

Indicate all hazards that may be present for each task. If any of these potential hazards are checked, it is the project manager's responsibility to determine how to eliminate/minimize the hazard to protect onsite personnel. Note: Task numbers refer to those identified in section 3.

(Highlight the check mark [√], copy and paste in the appropriate box)

Hazards	Task 1	Task 2	Task 3	Task 4	Task 5
Underground utilities		√		√	
Overhead utilities		√		√	
Excavations greater than 4' depth					
Open excavation fall hazards					
Heavy equipment		√		√	√
Drilling hazards		√		√	
Noise (above 85 dBA)	√	√		√	
Traffic concerns	√	√	√	√	√
Extreme weather conditions					
Rough terrain for drilling equipment					
Buried drums					
Heavy lifting (more than 50 lbs)					√
High risk fire hazard					

Poisonous insects or plants					
Water hazards					
Use of a boat					
Lockout/Tagout requirements					
Other:					

Hazards	Task 6	Task 7	Task 8	Task 9	Task 10
Underground utilities	√		√		√
Overhead utilities	√	√	√	√	√
Excavations greater than 4' depth	√		√		√
Open excavation fall hazards	√		√		√
Heavy equipment	√	√	√	√	√
Drilling hazards	√		√		
Noise (above 85 dBA)	√		√	√	√
Traffic concerns	√	√	√	√	√
Extreme weather conditions					
Rough terrain for drilling equipment					
Buried drums					
Heavy lifting (more than 50 lbs)	√		√		√
High risk fire hazard					
Poisonous insects or plants					
Water hazards					
Use of a boat					
Lockout/Tagout requirements					
Other:					

Describe any special precautions to be taken with respect to the hazards checked above:

Utility clearance will be performed to identify underground utilities in the areas of trenching and drilling. H&A personnel working on site need to be aware of heavy equipment operations at all times, particularly drilling rig equipment. Extra caution should be exercised when walking near/in drilling, trenching, and demolition areas. Ear plugs or muffs should be available for use as needed. Personnel are not allowed to enter trenches greater than 4 feet deep. Cones and barricade tape will be used to barricade work areas such as open boreholes or trenches.

5.0 PROTECTIVE MEASURES

5.1 Personal Protective Equipment Requirements

PPE Checklist

(Highlight the check mark [√], copy and paste in the appropriate box)

Required PPE	Task 1	Task 2	Task 3	Task 4	Task 5
Hard hat	√	√		√	
Safety glasses w/side shields		√	√	√	√
Steel-toe footwear	√	√	√	√	√
Hearing protection (plugs, muffs)	√	√		√	
Tyvek ™ coveralls		+	+	+	+
PE-coated Tyvek™ coveralls					
Boots, chemical resistant					
Boot covers, disposable					
Leather work gloves					
Inner gloves – nitrile		√	√	√	√
Outer gloves – nitrile		√	√	√	√
Tape all wrist/ankle interfaces					
Half-face respirator		*	*	*	*
Full-face respirator					
Organic vapor cartridges		*	*	*	*
Acid gas cartridges		*	*	*	*
Other cartridges: [Enter type here]					
P-100 (HEPA) filters		*	*	*	*
Face shield					
High Visibility Vest	√	√	√	√	√
Level of protection required [C or D]: Modified?	**D**	**D Mod**	**D Mod**	**D Mod**	**D Mod**

Required PPE	Task 6	Task 7	Task 8	Task 9	Task 10
Hard hat	√	√	√	√	√
Safety glasses w/side shields	√	√	√	√	√
Steel-toe footwear	√	√	√	√	√
Hearing protection (plugs, muffs)	√	√	√	√	√
Tyvek ™ coveralls	+		+		+
PE-coated Tyvek™ coveralls					
Boots, chemical resistant					
Boot covers, disposable					
Leather work gloves					
Inner gloves – nitrile	√		√		√
Outer gloves – nitrile	√		√		√

Tape all wrist/ankle interfaces					
Half-face respirator	*	*	*	*	*
Required PPE	**Task 6**	**Task 7**	**Task 8**	**Task 9**	**Task 10**
Full-face respirator					
Organic vapor cartridges	*	*	*	*	*
Acid gas cartridges	*	*	*	*	*
Other cartridges: [Enter type here]					
P-100 (HEPA) filters	*	*	*	*	*
Face shield					
High Visibility Vest	√	√	√	√	√
Level of protection required [C or D]: Modified?	**D Mod**	**D**	**D Mod**	**D**	**D Mod**

+ Tyvek will be worn by personnel that have potential for contact with contaminated media.
* If vapor concentrations exceed air monitoring action levels, personnel must don half-face respirators equipped with organic vapor cartridges.

Standby equipment to be available onsite: Half-face air-purifying respirator equipped with organic vapor cartridges and P-100 filters.

5.2 Personal Hygiene Safeguards

When handling soil samples and/or sampling equipment, dermal contact should be avoided. Hands and exposed skin surfaces should be washed thoroughly with soap and water after exiting the exclusion zones and removing contaminated PPE or whenever handling contaminated samples. Site personnel should always be cognizant of the possibility of incidental ingestion of contaminated materials. The site has drinking water, washing water, and restroom facilities available.

Eating and drinking is permitted only in designated locations on the site. These locations will be established, and will likely change, as the work progresses. Changing weather conditions may also be a factor in where the clean "break" locations are established.

No facial hair (e.g., beards) shall be worn on personnel that may don respirators. Long hair must be tied back.

5.3 Site Safety Equipment

Check all items that are required to be on site:

X	Fire extinguisher	X	First aid kit		Flashlight
	Air horn/Signaling device	X	Cellular phone		Duct tape
	Ladder	X	Barricade tape	X	Drum dolly
	Personal flotation devices	X	Safety cones		Harness/Lanyard
	Other, specify:				

5.4 Site Security & Work Area Controls

Access to each contaminated work area will be controlled during on-site activities as follows:

Work zones, including the designation of exclusion zones, will be delineated and controlled by the Haley & Aldrich Site Safety Officer.

Can **site access** be controlled by a perimeter fence or similar means? Y___ N _X__

If not, how will the site/work area be controlled during non-work hours to prevent access by unauthorized persons?

Environmental work area access control is the responsibility of Haley & Aldrich personnel. Site access control is the responsibility of the project redevelopment contractor, Baley Construction.

Work area will be barricaded with traffic cones and barricade tape to prevent access by unauthorized persons. Boreholes will either be completed by the end of each day or traffic covers will be placed over open boreholes during non-work hours. Trenches will either be completed by the end of the day or will be barricaded by traffic cones and barricade tape to prevent access during non-work hours.

6.0 MONITORING PLAN AND EQUIPMENT

Is air/**exposure monitoring** required at this work site for personal protection? Y _X_ N __

Is **perimeter monitoring** required for community protection? Y __ N _X_

Monitoring/Screening equipment required to be on site:

X	HNu analyzer (PID)	X	10.2e V		11.7eV	X	Combustible Gas Indicator (CGI) (LEL)
	Organic vapor monitor (FID)						Multiple Gas Detector – LEL/O_2/H_2S/CO
	Photovac Micro Tip, 10.6eV					X	Dust/Aerosol/Fiber count monitor
	Photovac GC						Colorimetric tubes; Specify:
	Other:						

Standard action levels and required responses for readings obtained with a multiple gas detector or an individual monitoring instrument are listed below. Do not deviate from these guidelines unless granted specific approval from the Corporate Health and Safety Manager.

Instrument	Normal	Operating levels	Action levels – required responses
Oxygen Meter	20.9%	Between 19.5-23.5%	Below 19.5 %: leave area, requires supplied air Above 23.5%: leave area, fire hazard
CGI	0%	Less than 10%	Greater than 10%: fire/explosion hazard; cease work
Hydrogen Sulfide	0%	Less than 10 ppm.	Greater than 15 ppm (or 10 ppm for 8 hrs) requires supplied air respirator (SAR)
Carbon Monoxide	0%	Less than 25 ppm	Greater than 200 ppm for 1 hour or 25 ppm for 8 hrs requires SAR

Description of Monitoring Requirements (include frequency and location by Task):

Monitoring Plan for Task Number(s):	2-10	Frequency:	4	times per	hour

The work zone and perimeter will be monitored every 15 minutes.

PPE upgrades will be based on the monitoring results and the action levels listed in **Table 5** (attached). The Site Safety Officer will be responsible for air monitoring and directing any PPE upgrades based on interpretation of the monitoring results.

Notes: 1. Exposure Guidelines for common contaminants are listed in **Table 4 (attached)**.
2. Record monitoring data and PPE upgrades on **Record of Field Monitoring** form **(attached)**; maintain with project files.

7.0 DECONTAMINATION

7.1 Personnel Decontamination

Are **decontamination procedures** required for personnel working on site? Y _X__ N ___
If yes, describe steps:

1. Wash exterior of boot and outer glove with Alconox solution.
2. Rinse outer boot and glove.
3. Remove and dispose of outer gloves (if not cleaned to "like new" condition).
4. Remove and dispose of coverall.
5. Remove and dispose of inner gloves in designated receptacle.
6. Field wash for personal hygiene.
7. Exit decon area.

Location of decontamination station: South entrance gate to Parcel C by the Baley field office trailer.

Disposal of PPE:

Disposable PPE will be double bagged and disposed of as trash. Other non-disposable equipment will be decontaminated as described below.

7.2 Tools & Equipment Decontamination

Check all **equipment and materials needed for decontamination** of tools and other equipment:

	Acetone	X	Distilled water	X	Poly sheeting
X	Alconox soap	X	Drums for water	X	Steam cleaner
X	Brushes		Hexane	X	Tap water
X	Disposal bags		Methanol	X	Washtubs
	Other, specify:				

Outline the **equipment decontamination procedures** for this project:

1. All sampling equipment will be decontaminated in a triple rinse system consisting ofa deionized water and alconox rinse, a deionized water rinse, and then a final rinse with tap water.

2. Drill rig equipment will be steam cleaned prior to drilling each boreholes and before transporting equipment off site.

3. OVA will be wiped with a wet cloth between monitoring locations.

Disposal methods for contaminated decontamination materials (e.g., wash water, rags, brushes, poly sheeting) will consist of:

Place detergent solutions and rinse water in Department of Transportation (DOT) approved 55-gallon drums.

Place and double bag disposable PPE and poly sheeting in trash receptacle.

Cleaning equipment (e.g. brushes, washtubs, and steam cleaner) will be decontaminated for reuse.

8.0 CONTINGENCY PLAN

EMERGENCY RESPONSE RESOURCES

Nearest Hospital: (see attached map) Address: Phone Number:	Harbour UCLA Medical Center 1000 W. Carson Street Torrance, CA 310-222-2101
Emergency Response Number:	**911**
Local Emergency Response Number (if not on 911 system):	**911**
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	**911**
Occupational Health Physician: Address: Phone Number: Emergency Phone Number:	Robert Power 2001 Fourth Avenue, San Diego, CA 92101 1-619-446-1524 1-619-446-1524
Haley & Aldrich Project Manager: Phone Number: Emergency Phone Number: Haley & Aldrich Field Manager: Phone Number: Emergency Phone Number: Client Contact/Project Manager: Phone Number: Emergency Phone Number:	Scott Zachary 619-280-9210 619-818-1790 Richard M. Farson 619-280-9210 619-818-1761 Brian Mossman 818-586-6015 818-519-0760
Other Entity: Address: Phone Number:	CHEMTREC (Chemical Transportation Emergency Center) 2501 M Street, NW; Washington, DC 20037 800.424.9300

Evacuation alarms and/or emergency information be communicated among personnel on site by the following means: _X_ Verbal communication. If communication will be by other means, describe:

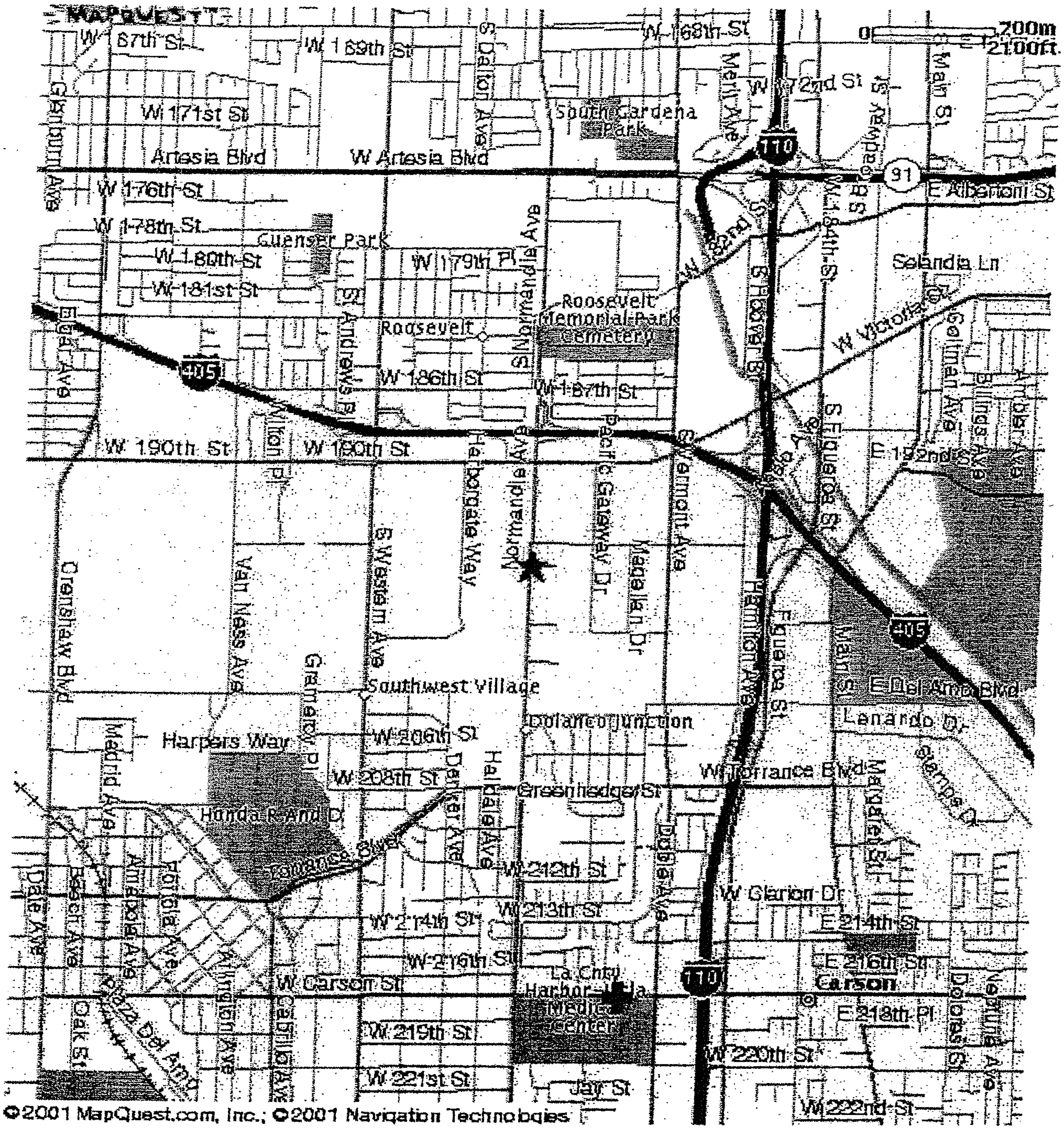
If necessary, Haley & Aldrich personnel will use an air horn or a vehicle horn to alert site personnel to an emergency situation where immediate evacuation of the work area is required.

Emergency services will be summoned: _X_ Via on-site phone. If contact will be by other

means, describe:

The **site evacuation plan** is as follows: If work zones are established, the Exclusion Zone will have several emergency exits which will allow safe egress in multiple directions from any point onsite. The exit selection will be based on the emergency location, type of emergency, and wind direction. Upon hearing the evacuation signal or otherwise being notified of an evacuation, employees will immediately travel to the assembly area located at the decontamination station.

Employees will follow a route that avoids locations downwind from the emergency. If emergency exits are used, employees will proceed to the assembly area by the quickest route possible, staying close to the perimeter of the Exclusion Zone. When the assembly area is reached, employees will immediately check in with the Haley & Aldrich Field Manager. The site will remain evacuated until the all clear signal has been given.


MAPQUEST
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W Victoria St
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Crenshaw Blvd
Van Ness Ave
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Normandie Ave
Pacific Gateway Dr
Magellan Dr
Vermont Ave
Hamilton Ave
Figueroa St
Main St
Southwest Village
E Del Amo Blvd
Dolanco Junction
Lenardo Dr
Harpers Way
W 206th St
W 208th St
Greenhedge St
W Torrance Blvd
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Jay St
W 222nd St
Dale Ave
Oak St
Cabrillo Ave
Harbor-UCLA Medical Center
Madrid Ave
Gramercy Pl
Halldale Ave
Denker Ave
Dolores St
Vermont Ave
Figueroa St
Margaret St
Stamps Dr
Dobbie Ave
Harborgate Way
Milton Pl
Andrews Pl
Gardena Blvd
Gellman Ave
Billings Ave
Amber Ave
405
110
91
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(paste map showing route to hospital here)

TABLE 1

Chemicals Detected in Groundwater Samples
Boeing Realty Corporation Former C-6 Facility

Chemical	Maximum Concentrations (ug/l)
1,1- Dichloroethene	88,000
1,1- Dichloroethane	1,400
1,1,1- Trichloroethane	110,000
Trichloroethene	29,000
Methylisobutyl ketone	100,000
cis-1,2 Dichloroethene	7,700
trans-1,2 Dichloroethene	1,000
Benzene	280
Toluene	140,000
Chloroform	2,400
Methyl ethyl ketone	21,000

TABLE 2
CHEMICALS DETECTED IN SOIL SAMPLES
Boeing Realty Corporation Former C-6 Facility

Chemical	Maximum Concentration (mg/kg)
TRPH [a]	20,000
Diesel	20,000
Benzene	1.2
Toluene	3,700
Ethylbenzene	220
Xylenes	2,300
1,1-dichloroethene	162
1,2-dichloroethane	0.0087
1,1,1-trichloroethane	300
1,1,2-trichloroethane	19
trichloroethene	490
tetrachloroethene	99
polychlorinated biphenyls	9.8
Arsenic	350
Hexavalent Chromium	491
Lead	1790

Notes:
(a) TRPH - Total Recoverable Petroleum Hydrocarbons

TABLE 3

CHEMICAL EXPOSURE SYMPTOMS

Boeing Realty Corporation Former C- 6 Facility

CHEMICAL	ACUTE EXPOSURE SYMPTOMS (a)	TARGET ORGANS
Benzene	Irritant to eyes, nose, respiratory system, nausea	Skin, liver, kidneys, respiratory system, cardiovascular system, Central nervous system
Ethylbenzene	Irritant to eyes, mucous Membranes, dermatitis, Narcosis coma	Skin, liver, kidneys, respiratory system, cardiovascular system, Central nervous system
Toluene	Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils	Central nervous system, liver, kidneys, skin
Xylene	Dizziness, excitement, vomiting	Central nervous system, eyes, GI tract, blood, liver, kidneys, skin
Trichloroethene (TCE)	Headache, vertigo, visual disturbance, tremors, nausea, Vomiting, irritated eyes, Dermatitis, cardiac arrhythmia	Respiratory system, heart, liver, kidneys, CNS, skin
Tetrachloroethene (PCE)	Headache, vertigo, visual disturbance, tremors, nausea, vomiting, irritated eyes, nose, and throat	Respiratory system, eyes, liver, kidneys, CNS, skin

Notes:

(a) Sittig, Marshall. 1985. Handbook of Toxic and Hazardous Chemicals and Carcinogens. Park Ridge, New Jersey. Noyes Publications.

TABLE 4
HAZARD MONITORING & EXPOSURE LIMITS

CONTAMINANTS OF CONCERN	ROUTES OF EXPOSURE	IDLH	PEL	TLV	PID	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION
Acetone	R, I, C	2500	1000	500 Cv 750	9.69	60	13	–	Chem, sweet, pungent
Ammonia	R, A, I, C	300	50	25 Cv 35	–	–	0.5-2	10	Pungent suffocating odor
Benzene	**R,A,I,C**	**Ca**	**1**	**Sk 0.5**	**9.25**	**150**	**4.68**	–	**Solvent**
Carbon tetrachloride (Tetrachlormethane)	R,A,I,C	Ca	2 Cv25 200: 5 min peak	Sk 5 Cv 10	11.47**	10	50	–	Sweet, pungent
Dichlorodifluoromethane (Freon 12)	R,C	1500	1000	1000	11.97**	15	–	–	–
1,1-Dichloroethane	R,I,C	3000	100	100	–	80	200	–	Distinct
1,2-Dichloroethane	R,I,A,C	Ca	Cv 100 50	10	11.12**	80	88	–	Chloroform
1,1-Dichloroethylene (Vinylidene chloride, 1,1-DCE	R,I	Ca	–	5 Cv 20	*	40	190	–	–
1,2-Dichloroethylene	R,I,C	1000	200	200	9.65	50	0.85	–	Ether-like acrid
Ethanol	R,A,I,C	–	1000	1000	10.48**	25	10	–	Sweet
Ethylbenzene	**R,I,C**	**800**	**100**	**Cv 125 100**	**8.76**	**100**	**2.3**	**E 200**	**Aromatic**
Gasoline	R,I,C	Ca	–	300	–	–	–	E 0.5	Petroleum
Hexane, n-isomer	R,I,C	–	50	50	10.18	70	130	E.T 1400-1500	Mild, gasoline-like
Methyl Chloroform (1,1,1-TCA)	R,I,C	700	350	350	**	105	20-100	–	Chloroform-like
Methylene Chloride (Dichloromethane, Methylene dichloride)	R,I,C	Ca	25	50	11.35**	100	25-50	E 5000	Ether-like
MIBK (Hexone)	R,I,C	500	100	50 Cv 75	–	–	–	–	Pleasant
Naphthalene	R,A,I,C	250	10	10	8.14	–	0.3	E 15	Mothball-like
Tetrachloroethylene (Perchloroethylene)	**R,I,C**	**Ca**	**25**	**25**	**9.32**	**70**	**4.68**	**N.T513-690**	**Ether, chloroform-like**
Toluene	**R,A,I,C**	**500**	**200**	**50**	**8.82**	**110**	**2.14**	**E300-400**	**Mothball-like**
Trichloroethylene	**R,I,C**	**Ca (1000)**	**50**	**50**	**9.47**	**70**	**21.4**	–	**Solventy, chloroform-like**
Xylenes	**R,A,I,C**	**1000**	**100**	**100**	**8.56/8.44**	**111/116**	**1.1**	**E.N.T. 200**	**Aromatic**
DUSTS, MISTS AND MISCELLANEOUS COMPOUNDS									
PCBs-54% Chlorine	**R,A,I,C**	**Ca**	**0.5 mg/m³ Sk**	**0.5 mg/m³ Sk**	–	–	–	–	**Mild, hydrocarbon**
Arsenic	**R,A,I,C**	**Ca**	**0.01 mg/m³**	**0.2 mg/m³**	–	–	–	–	–
Chromium: Species Dependent	**R,I,A,C**	**25 mg/m³**	**Spec Dep**	**Spec Dep**	–	–	–	–	–

Notes: All units in ppm unless otherwise noted.

R = Respiratory (Inhalation) I = Ingestion A = Skin Absorption C = Skin and/or Eye Contact

TABLE 4
HAZARD MONITORING & EXPOSURE LIMITS

CONTAMINANTS OF CONCERN	ROUTES OF EXPOSURE	IDLH	PEL	TLV	PID	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION

Cv = Ceiling value Ca = Carcinogen Sk = Skin

** = Use 11.7 eV lamp

TABLE 5

MONITORING METHOD, ACTION LEVELS AND PROTECTIVE MEASURES

INSTRUMENT	HAZARD	ACTION LEVEL	ACTION RESPONSE
Respirable Dust Monitor	Contaminant Particles	> 0.5 mg/m^3	Level C Protection
OVA, HNU[2], Photovac Microtip	Organic Vapors	Background 3 ppm > background or lowest OSHA permissible exposure limit, whichever is lower, or as modified for this task. Sustained for >3 sec in the breathing zone. 50 ppm over background unless lower values required due to respirator protection factors.	Level D Protection Level C, site evacuation may be necessary for specific compounds Level B[3]
Explosimeter[4] (LEL)	Explosive Atmosphere	<10% Scale Reading 10-15% Scale Reading >15% Scale Reading	Proceed with work Monitor with extreme caution Evacuate site
0^2 Meter[5]	Oxygen Deficient Atmosphe	19.5 % O^2 19.5% - 25% 0^2 < 19.5% 0^2 > 22% 0^2	Monitor with caution Continue with caution Evacuate site; oxygen deficient Evacuate site; fire hazard
Radiation Meter[6]	Ionizing Radiation	0.1 Millirem/Hour > 1 Millirem/Hour	If > 0.1, radiation sources may be present[7] Evacuate site; radiation hazard
Drager Tube	Vapors/Gases	Species Dependent > 1 ppm vinyl chloride > 1 ppm benzene > 1 ppm 1,1-DCE	Consult Table 1 or other resources for concentration toxicity/detection data. Upgrade to Level C and evacuate Upgrade to Level B if concentration of compounds exceed thresholds shown at left.
Gas Chromatograph (GC)	Organic Vapors	3 ppm > background or lowest OSHA permissible exposure limit, whichever is lower.	One site monitoring or tedlar bag sample collection for laboratory analysis.

Notes:

1. Monitor breathing zone.
2. Can also be used to monitor some inorganic species.
3. Positive pressure demand self contained breathing apparatus
4. Lower explosive limit (LEL) scale is 0-100%. LEL for most gasses is 15%.
5. Normal atmospheric oxygen concentration at sea level is 20%
6. Background gamma radiation is ~0.01-0.02 millirems/hour.

7. Contact H&A Health and Safety staff immediately.

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HAZARD MONITORING & EXPOSURE LIMITS

CONTAMINANTS OF CONCERN	ROUTES OF EXPOSURE	IDLH	PEL	TLV	PID	FID	ODOR THRES-HOLD	IRRITATION THRESHOLD	ODOR DESCRIPTION
Acetone	R, I, C	2500	1000	500 Cv 750	9.69	60	13	–	Chem, sweet, pungent
Ammonia	R, A, I, C	300	50	25 Cv 35	–	–	0.5-2	10	Pungent suffocating odor
Benzene	**R,A,I,C**	**Ca**	**1**	**Sk 0.5**	**9.25**	**150**	**4.68**	**–**	**Solvent**
Carbon tetrachloride (Tetrachlormethane)	R,A,I,C	Ca	2 Cv25 200: 5 min peak	Sk 5 Cv 10	11.47**	10	50	–	Sweet, pungent
Dichlorodifluoromethane (Freon 12)	R,C	1500	1000	1000	11.97**	15	–	–	–
1,1-Dichloroethane	R,I,C	3000	100	100	–	80	200	–	Distinct
1,2-Dichloroethane	R,I,A,C	Ca	Cv 100 50	10	11.12**	80	88	–	Chloroform
1,1-Dichloroethylene (Vinylidene chloride, 1,1-DCE	R,I	Ca	–	5 Cv 20	*	40	190	–	–
1,2-Dichloroethylene	R,I,C	1000	200	200	9.65	50	0.85	–	Ether-like acrid
Ethanol	R,A,I,C	–	1000	1000	10.48**	25	10	–	Sweet
Ethylbenzene	**R,I,C**	**800**	**100**	**Cv 125 100**	**8.76**	**100**	**2.3**	**E 200**	**Aromatic**
Gasoline	R,I,C	Ca	–	300	–	–	–	E 0.5	Petroleum
Hexane, n-isomer	R,I,C	–	50	50	10.18	70	130	E.T 1400-1500	Mild, gasoline-like
Methyl Chloroform (1,1,1-TCA)	R,I,C	700	350	350	**	105	20-100	–	Chloroform-like
Methylene Chloride (Dichloromethane, Methylene dichloride)	R,I,C	Ca	25	50	11.35**	100	25-50	E 5000	Ether-like
MIBK (Hexone)	R,I,C	500	100	50 Cv 75	–	–	–	–	Pleasant
Naphthalene	R,A,I,C	250	10	10	8.14	–	0.3	E 15	Mothball-like
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Arsenic	**R,A,I,C**	**Ca**	**0.01 mg/m³**	**0.2 mg/m³**	**–**	**–**	**–**	**–**	**–**
Chromium: Species Dependent	**R,I,A,C**	**25 mg/m³**	**Spec Dep**	**Spec Dep**	**–**	**–**	**–**	**–**	**–**

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HALEY & ALDRICH

RECORD OF FIELD MONITORING

PROJECT		H&A FILE NO.	
LOCATION		PROJECT MGR.	
CLIENT		FIELD REP	
CONTRACTOR		DATE	

Project Description: _____

Task Description: _____

Instrument Type: 1) _____ Serial Number: _____

(OVA, LEL, PID, etc) 2) _____ Serial Number: _____

Calibration and/or operational check completed as per manufacturers instructions: ☐ Yes ☐ No

Time completed: _____

Weather conditions: _____

Reading Type:(1)	Level: (ppm or indicate units)	Time:	PPE Level:(2)

1. Key to Reading Types:
   Breathing Zone-BZ
   Perimeter-P
   Surface-S

2. EPA Levels B, C or D

Comments: _____

The following information should be maintained for all projects requiring air monitoring.